RESOURCES

Some findings and conjectures from
recent research into resource development and use

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You can't escape the responsibility of tomorrow by evading it today.

—ABRAHAM LINCOLN.

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Looking into the Future

FROM THE EARLIEST DAYS of the American republic, its citizens have been concerned about the long-range economic prospects, but only in more recent years has statistical evidence been gathered and organized in a way that records and measures the economic development of the country with reasonable accuracy. On the basis of current and historical economic information, it is now feasible to project past trends of economic growth some time into the future. By drawing a picture of what things might be like ten, twenty, or more years ahead, it becomes possible to uncover obstacles which, unless removed, may hinder development.

Over the long term the United States has grown rapidly as a result of a large supply of land and other natural resources, a vigorous, mobile, and increasing population, free and decentralized economic and political institutions, a large internal free trade market, the early establishment and rapid spread of a general public educational system, and an eagerness to apply new technology to the problems of economic development.

IN THE LAST HUNDRED YEARS population has increased sixfold from 31 million to 180 million. The net reproduction rate is about 1.7, as compared with slightly less than 1 in 1935 at the bottom of the Great Depression, and about 1.3 fifty years ago.

Over the century the gross national product (which measures the total value of end products and services in the economy) has increased by about thirty times in real terms, that is, with allowance for changes in the value of the dollar. In 1960 GNP was $503 billion, an increase of about 40 per cent in the decade of the 1950's, as calculated in constant prices. Total national wealth, including structures of all kinds, producer-durable and consumer-durable equipment, inventories, public and private lands and net foreign assets, though very difficult to calculate, probably exceeds $1.5 billion—more than double what it was valued at in constant prices fifty years ago.

Industrial production, including manufacturing, mining, and utilities, has increased greatly over the years, by nearly three times since 1929. Farm output rose by only a little more than 50 per cent during the same period.

The total labor force, including about 2.5 million in the Armed Services, came to about 73 million persons in 1960; in 1910 it was about 32 million. Weekly hours of work of production workers in manufacturing have dropped from about 47 in 1920 to about 39 in 1960.

As in other countries, there has been a long-term upward movement of prices in the United States

economy. Since 1913, the year immediately prior to the First World War, the wholesale price index has increased 2.6 times and the consumer price index 3 times. The wholesale price index of all commodities during the past decade rose by about 16 per cent, though prices received by farmers for all farm products dropped by about 8 per cent.

PROJECTION OF ECONOMIC MAGNITUDES into the distant future is hazardous, no matter how accurate the historical data on which it is based. A great deal hinges upon the trends in the birth rate, in size of the labor force, in technology, in productivity increase, and many other factors. However, assuming that past trends more or less continue, that no major war or other catastrophe occurs, and that a reasonably high level of economic activity is maintained, the projections shown below may be offered.

	1960	*1980*	*2000*
Population (millions)	180	245	330
Labor force (millions)	73	102	140
Households (millions)	53	73	100
GNP ($ billion)	503	1,060	2,200
GNP per worker (dollars)	6,900	10,000	15,000
Government expenditures ($ billion)	100	230	520
Private investment ($ billion)	73	160	340
Personal consumption expenditures ($ billion)	330	660	1,300

These estimates are taken from a work in progress in Resources for the Future which attempts to delineate the size and general shape of the U.S. economy for twenty and forty years ahead on the basis of carefully stipulated assumptions. A change in any one of these basic factors would change the complex of estimates. Furthermore, the preceding table shows for 1980 and 2000 only medium estimates for all items. Actually there could be a considerable range above and below the estimates in the table. For example, with a larger population and labor force and a more rapid increase in productivity, GNP in 1980 might come to $1,250 billion, instead of $1,060 billion. Or, with a smaller population and labor force and a slower rate of productivity increase, GNP in 1980 might come to only $960 billion. By 2000 the range would be even greater. On the basis of these projections that suggest the general dimensions of future needs, the RFF group is developing projections of the demand for intermediate materials like steel and lumber; and of the requirements for and potential supplies of basic natural resources.

Why make projections as far ahead as forty years, which is beyond the planning horizon of most business firms and government agencies? One answer, among others, is that many decisions having to do with natural resources development, such as the opening of new mines or the building of huge multiple-purpose dams, must be decided on the basis of the best available estimates of their probable long-range effect. Forty years is none too long when one is thinking of Hoover Dam, the nationwide soil conservation program, or the development of a private oil-shale industry. These decisions, whether public or private, have to be taken with some view in mind of their effects forty or even more years into the future.

Adapted from lectures by
JOSEPH L. FISHER

Of Pepys, Swedes, And Small Forests

"MY LORD CARNAVON," Samuel Pepys wrote in his diary for May 5, 1667 (a Sunday on which he also recorded hearing a dull sermon and complained that all the pretty women in the congregation had gone to the country) "says of wood that it is an excrescence of the earth provided by God for the payment of debts."

Three centuries later pocketbook pressures on individually held forest land still are a barrier to good management and conservation even though one no longer speaks out about the problem with the cynical relish of the noble lord.

Small holdings (acreages of up to 5,000 which, in terms of management at least, are "small" in relation to "medium" holdings of 5,000 to 50,000 acres and "large" ones of over 50,000) represent about 54 per cent of the total commercial forest land in the 48 contiguous states. Yet the small holdings produce far less than half of the annual timber cut. The Forest Service's rankings of high, low, and medium productivity per acre indicate that only about 40 per cent of the small-holdings acreage falls into the highest class, compared with nearly 80 per cent for both public and large private holdings. And within the up-to-5,000-acre classification there is slight but consistent relation between size and productivity, with holdings of under 100 acres rating lowest of all.

It was on the basis of this and other evidence turned up in the Timber Resources Review that

Richard E. McArdle, Chief of the Forest Service, observed that "The real key to America's future timber supply lies in the hands of one out of every ten families who own small forests."

These Forest Service data are the starting point of a study that Charles H. Stoddard, formerly of the RFF staff, has made into the management of small forest holdings and of present and proposed programs for increasing their yields of timber. His preliminary findings indicate that on most small holdings, particularly those of less than 100 acres, purely economic factors are weak incentives to better management—in part, perhaps, an echo of Lord Carnavon's bleak comment from the 17th Century.

THINGS SEEM to be better managed in Sweden. Dean Thorsten Streyffert, of the Royal School of Forestry in Stockholm, said recently that a survey in his country shows that there was no great difference in the management of forests belonging to the government, to lumber and pulp companies, and to private owners. "The last group," he notes, "is dominated by the farmers and thus represents the small forest holdings as compared with the big holdings belonging to the two other groups." Even in Sweden, he added, this finding was a surprise to many people.

In Washington as principal speaker of one of the programs of the 1961 Resources for the Future Forum, Dean Streyffert analyzed some of the reasons for the good showing of small holders. Size of tract and type of ownership, he pointed out, are quite separate factors. "The size of holding has a bearing primarily on the efficiency of management, whereas the ownership largely decides the forest policy of the owner, or at least his general attitude on the management of his forest property as part of his total property." In most instances the enterprise as a whole means farming.

Consequently, Sweden's programs for small forests have aimed both at overcoming disadvantages of small scale and at integration of farm and forestry operations. Although government regulation of cutting remains a useful part of Sweden's forestry program, the main emphasis in recent efforts to improve management of small holdings has been on fostering a favorable economic climate together with education and technical assistance. Chief among the instruments through which progress has been made are the Forest Owners' Associations and the Forest Cooperatives. In American terminology both types of organization are cooperatives; the Associations, in fact, have the broader cooperative functions, while the Cooperatives' principal task is to provide high-level operating services that otherwise would be beyond the reach of most individual small holders.

Mr Stoddard is now Director of the Technical Review Staff, U.S. Department of the Interior His study will be published this summer by RFF.

THE ROAMING TANNERY

WHY AN INDUSTRY moves from one area to another in the wake of developing markets, labor availability, or changes in technology, is rarely seen more plainly than in the record of the leather and leather products industry. This is one of the "slow-growth" industries whose regional changes over time are analyzed in a recently published RFF study.

Basically, the shifts of the leather and leather products industry since 1939 have gone in two divergent directions. Shoemaking has followed the common path westward. Even before this the stimulus of new pulls—the introduction of machinery to replace skilled labor, the advantage of closeness to terminal markets—had attracted a part of the industry out of New England to the Middle Atlantic states and then to the Great Lakes states. The trend west by now has continued into Texas and California.

But accompanying the westward trek of the shoemakers there has been a reverse shift eastward in leather tanning and light leather goods production. A large part of this type of production has moved back into areas which once were known for the volume of their tanning operations but which later were abandoned in favor of areas close to Middle Western stockyards.

"As there is substantial weight-loss in the processing of hides, the tanning industry is oriented to the sources of leather inputs. This form of orientation has not always been prevalent. In earlier days the weight of the bark used in tanning was five times the weight of the product and two and a half times the weight of the hide. Production was carried on close to the forests in the East. The development of concentrated and inorganic tanning which diminished the importance of transporting bark, plus the development of large-scale meat packing in the Midwest, caused a widespread migration to the Great Lakes states. Only the light leathers based upon imported hides retained much activity on the Eastern Seaboard.

"In our current period the trend is reversing itself, and there is a shift back to the Eastern Seaboard. As before, the reason is a change in the access to materials. The demand for leather has come to exceed the supplies that develop as a by-product of meat packing. As a consequence, a larger share of the leather output is based upon imported hides; hence the decline in the Great Lakes states and the expansion in the Middle Atlantic states."

From Regions, Resources, and Economic Growth, *by Harvey S. Perloff, Edgar S. Dunn, Jr., Eric E. Lampard, and Richard F. Muth, published for RFF by The Johns Hopkins Press, 1960.*

ONE OF THE GREAT scientific breakthroughs of my time has to do with an interrelated complex, with genetics, with nutrition, and with the related biochemical sciences which deal with plant and animal growth and health. These are agriculture's new multipliers, which make it possible for farmers to produce more and more end-use product with less and less labor and, relatively speaking, less and less land.—*Oris V. Wells*

WATER LAW IN WEST GERMANY

SINCE THE FORMATION of the Federal Republic of West Germany, a Ministry for Atomic Energy and Water Management has been entrusted with the development of federal water policy.

A water management law, passed in July 1957, offers a general framework into which possibly divergent, but hopefully uniform, state water laws are to be fitted on initiative of the states. The federal law itself requires application for a permit or for an acquisitive right when a given source of water is to be put to a particular use. The application may be denied, however, and there is no legal claim either to a permit or a right. Permits are revocable instruments. Rights are not; they are granted under public law. In either case, conditions of water use may be regulated and supervision of water use ordered. Penalties and fines are to be imposed for failure to obtain the necessary permit or right or for failure to comply with established conditions of water use.

Persons suffering damages from pollution may sue the polluter, and in doing so are not required to present proof of negligence on his part. Where the available volume of water or its quality does not meet the needs of all users, the preferred user may be required to pay compensation to those deprived of their privilege. Drinking water supplies are given priority over other water uses.

General regulations may require treatment of all waste waters; biological purification of municipal sewage; and exclusion of wastes dangerous to health, of oil, of flammable liquids, and of other objectional substances. Lakes and rivers are to be kept clean enough to sustain their normal water flora and fauna, and to permit bathing.—*Gordon M. Fair, speaking on pollution abatement in the Ruhr at RFF's 1961 Forum.*

In the Greenwood

ALREADY BY A.D. 675 persecution of wildlife had reached a pitch which led St. Cuthbert to establish on his Farne Island retreat off the Northumberland coast the oldest of European sanctuaries, which is maintained with loving vigilance at this day. Loss of wilderness was one of the urgent problems which faced King William the Conqueror when he inaugurated his new administration in 1066. He anticipated the American National Parks by establishing a series of Royal Forests to conserve some of the last substantial remnants of English wilderness.

These Royal Forests were closely and accurately demarcated, and on the whole vigilantly and efficiently administered, under a code of law and management designed to conserve not only the deer and other wildlife but the habitat, or "vert" as it was called. Some of the penalties for infringement have been modernized, but in the New Forest of some 65,000 acres Crown management for conservation has been continuous over nearly nine centuries, and during the past two years the Nature Conservancy, by agreement with the Forestry Commission, has undertaken nature protection duties in this ancient reserve.

It gave us great pleasure last June that several leading American conservationists were able to walk through it, with a number of ours, in commemoration of the historic walk along the same route fifty years earlier by Theodore Roosevelt and Edward Grey, just at the time when the great American conservation movement was springing to fame.

Unfortunately, apart from the New Forest and Wychwood Forest—now a National Nature Reserve—nearly all our original series of officially conserved national areas have been filched away and destroyed by those encroaching interests which, like jackals and hyenas, are always hanging around in the shadows waiting their chance to supersede trusteeship by exploitation.—*E. M. Nicholson, speaking on Great Britain's Nature Conservancy at RFF's 1961 Forum.*

NEW RFF STUDIES

Western Forest Industry: An Economic Outlook, by John A. Guthrie and George R. Armstrong
352 pages 1961 $6.50

Energy in the American Economy, by Sam H. Schurr and Bruce C. Netshcert, with Vera E. Eliasberg, Joseph Lerner, and Hans H. Landsberg
796 pages 1960 $12.50

Above books obtainable from booksellers or The Johns Hopkins Press, Baltimore 18, Maryland

The Cost of Capital in Canada—With Special Reference to Public Development of the Columbia River, by G. L. Reuber and R. J. Wonnacott
112 pages June 1961 $1.50

Transportation and Urban Land, by Lowdon Wingo, Jr.
144 pages June 1961 $2.00

A Report on Planning, Policy Making, and Research Activities of the U.S. Department of the Interior, by the Staff of Resources for the Future
48 pages May 1961 $.50

Three Studies in Minerals Economics, by Orris C. Herfindahl
64 pages February 1961 $1.00

Exploration for Non-Ferrous Metals: An Economic Analysis, by Lee E. Preston
232 pages October 1960 $2.00

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